# CDP-195/295/491

# SERVICE MANUAL

*US Model*
*CDP-195/491*

*Canadian Model*

*AEP Model*

*E Model*
*CDP-195/295*

*UK Model*
*CDP-491*

*Australian Model*
*CDP-295*

**Photo : CDP-295**

| | |
|---|---|
| Model Name Using Similar Mechanism | CDP-291/391 |
| CD Mechanism Type | CDM14-5BD1 |
| Optical Pick-Up Block Type | BU-5BD1 |

## SPECIFICATIONS

**Compact disc player**

| | |
|---|---|
| Frequency response | 2 Hz – 20 kHz ± 0.5 dB |
| Signal to noise ratio | More than 100 dB |
| Dynamic range | More than 97 dB |
| Harmonic distortion | Less than 0.005% |
| Channel separation | More than 95 dB |

**Outputs**

| | |
|---|---|
| LINE OUT (phono jacks) | Output level 2 V (at 50 kilohms) Load impedance over 10 kilohms |
| PHONES (stereo phone jack) | Output level max. 10 mW Load impedance 32 ohms |

**General**

| | CDP-195/295/491 |
|---|---|
| Power requirements | Model for Continental Europe 220 – 230 V AC, 50/60 Hz<br>Model for Canada 120 V AC, 60 Hz<br>Model for Australia 240 V AC, 50 Hz<br>Model for other countries 110, 120, 220 or 240 V AC, adjustable, 50/60 Hz |
| Power consumption | 12 W |
| Dimensions (approx., including projections) | 430 × 100 × 280 mm (w/h/d) (17 × 4 × 11 1/8 inches) |
| Weight (approx.) | 3.5 kg (7 lbs 12 oz) |

**Supplied accessories**

| | | |
|---|---|---|
| Audio cord | | 1 (2 phono plugs – 2 phono plugs) |
| Remote commander | (CDP-295/491) | 1 |
| R6(size AA) batteries | (CDP-295/491) | 2 |
| AC plug adaptor (for some areas) | | 1 |

**Remote commander RM-D295 (CDP-295/491)**

| | |
|---|---|
| Remote control system | Infrared control |
| Power requirements | 3 V DC with two R6 (size AA) batteries |
| Dimensions | Approx. 40 × 20 × 175 mm (w/h/d) (1 3/4 × 13/16 × 7 inches) |
| Weight | Approx. 95 g (4 oz) Including batteries |

Design and specifications subject to change without notice.

**CLASS 1 LASER PRODUCT**
**LUOKAN 1 LASERLAITE**
**KLASS 1 LASERAPPARAT**

This Compact Disc player is classified as a CLASS 1 LASER product.
The CLASS 1 LASER PRODUCT label is located on the rear exterior.

MICROFILM

# COMPACT DISC PLAYER

# SONY®

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

## PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

**CAUTION**
Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

**NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT**

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

1. Laser Diode Properties
   - Material: GaAlAs
   - Wavelength: 780nm
   - Emission Duration: continuous
   - Laser Output: max.44.6μW*

   * This output is the value measured at a distance of about 200mm from the objective lens surface on the Optical Pick-up Block.

2. During service, do not take the Optical Pick-up Block apart, and do not adjust the APC circuit. If there is a breakdown in the APC circuit (including laser diode), replace the entire Optical Pick-up Block (including APC borad).

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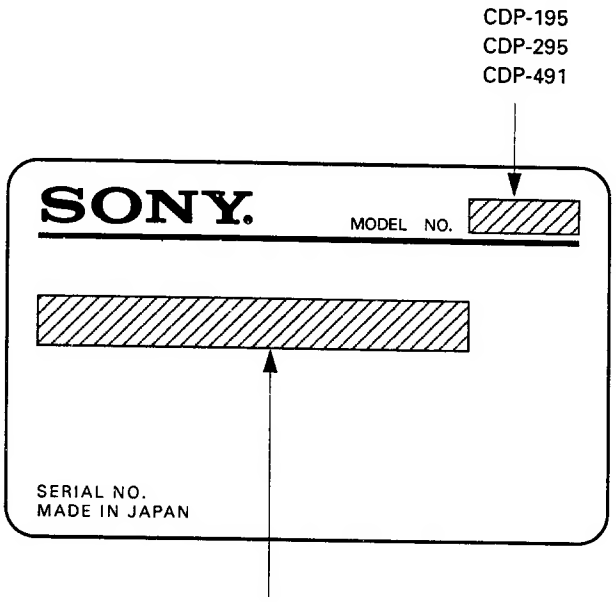
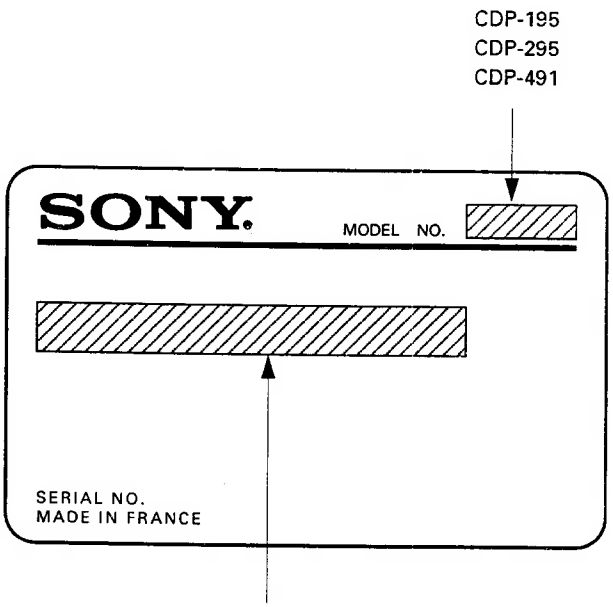
## MODEL IDENTIFICATION

### - SPECIFICATION LABEL -




| | |
|---|---|
| US, Canadian MODEL: | AC120, 60Hz 12W |
| AEP MODEL: | AC220-230V, 50/60Hz |
| Australian MODEL: | AC240V, 50/60Hz |
| E, Saudi Arabian MODEL: | AC110-120, 220-240V, 50/60Hz, 12W |

| | |
|---|---|
| AEP MODEL: | AC220-230V, 50/60Hz |
| UK MODEL: | AC240V, 50/60Hz |

## SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer: Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

### LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig.A)

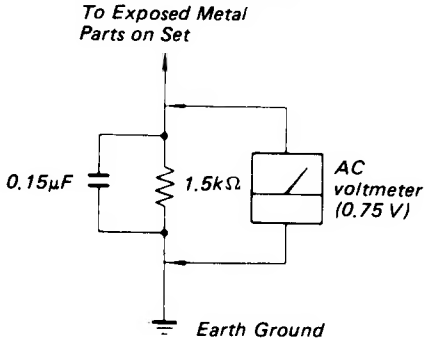
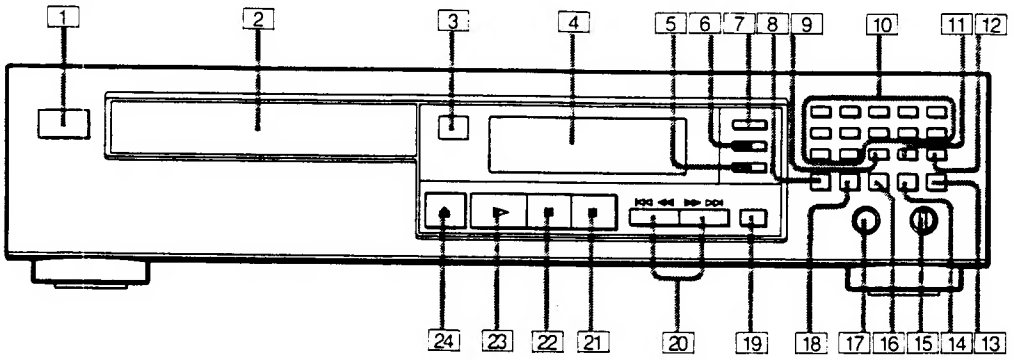



*Fig. A. Using an AC voltmeter to check AC leakage.*

# SECTION 1
# GENERAL

## LOCATION OF CONTROLS

This section is extracted from instruction manual.




CDP-295

1 POWER switch
2 Disc tray
3 Remote sensor
4 Display window
5 PROGRAM button
6 SHUFFLE button
7 CONTINUE button
8 TIME button
9 CHECK (program check) button
10 Numeric buttons
11 CLEAR (program clear) button
12 >12 (over 12) button
13 MUSIC SCAN button
14 PEAK SEARCH button
15 PHONE LEVEL control
16 FADER button
17 PHONES jack
18 REPEAT button
19 EDIT/TIME FADE button
20 ⏮ ◀◀/▶▶ ⏭ (AMS*/RMS**/manual search) buttons
21 ■ (stop) button
22 ❚❚ (pause) button
23 ▶ (play) button
24 ⏏ (open/close) button

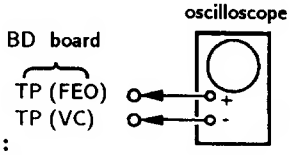
* AMS is the abbreviation of Automatic Music Sensor.
** RMS is the abbreviation of Random Music Sensor.

# SECTION 2
# ELECTRICAL BLOCK CHECKING

**Note :**

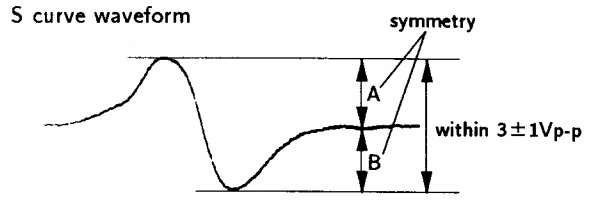
1. CD Block basically constructed to operate without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (3-702-101-01) unless otherwise indicated.
3. Use the oscilloscope with more than 10MΩ impedance.
4. Clean an object lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.

## S Curve Check




**Procedure :**

1. Connect oscilloscope to test point TP (FEO) on BD board.
2. Connect between test point TP (FES) and TP (VC) by lead wire.
3. Turned Power switch on and actuate the focus serch. (actuate the focus serch when disc table is moving in and out.)
4. Check the oscilloscope waveform (S curve) is symmetrical between A and B. And confirm peak to peak level within 3±1Vp-p.

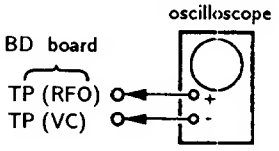



5. After check, remove the lead wire connected in step 2.

**Note :** • Try to mesure several times to make sure that the ratio of A : B or B : A is more than 10 : 7.

• Take sweep time as long as possible and light up the brightness to obtain best waveform.

## RF Level Check

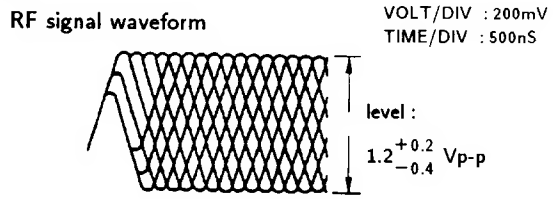



**Procedure :**

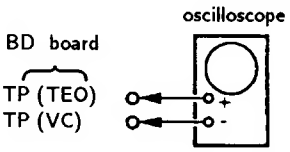
1. Connect oscilloscope to test point TP (RFO) on BD board.
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Confirm that oscilloscope waveform is clear and check RF signal level is correct or not.

**Note :**

Clear RF signal waveform means that the shape "◇" can be clearly distinguished at the center of the waveform.

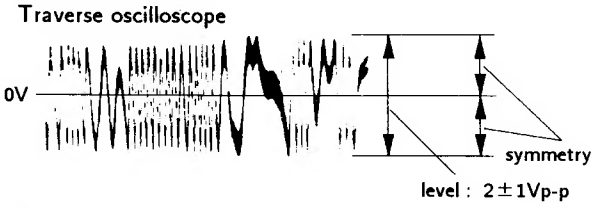



## E-F Balance Check




**Procedure :**

1. Connect test point TP (ADJ) to ground and TP (TES) to TP (VC) with lead wire.
2. Connect oscilloscope to test point TP (TEO) on BD board.
3. Turn Power switch on.
4. Put disc (YEDS-18) in and playback.
5. Confirm that the osilloscope waveform is symmetrical on the top and bottom in relation to 0V, and check this level.

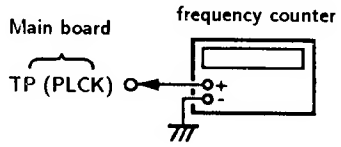



6. Remove the lead wire connected in step 1.

## RF PLL Free-run Frequency Check

**Procedure :**

1. Connect frequency counter to test point (PLCK) with lead wire.



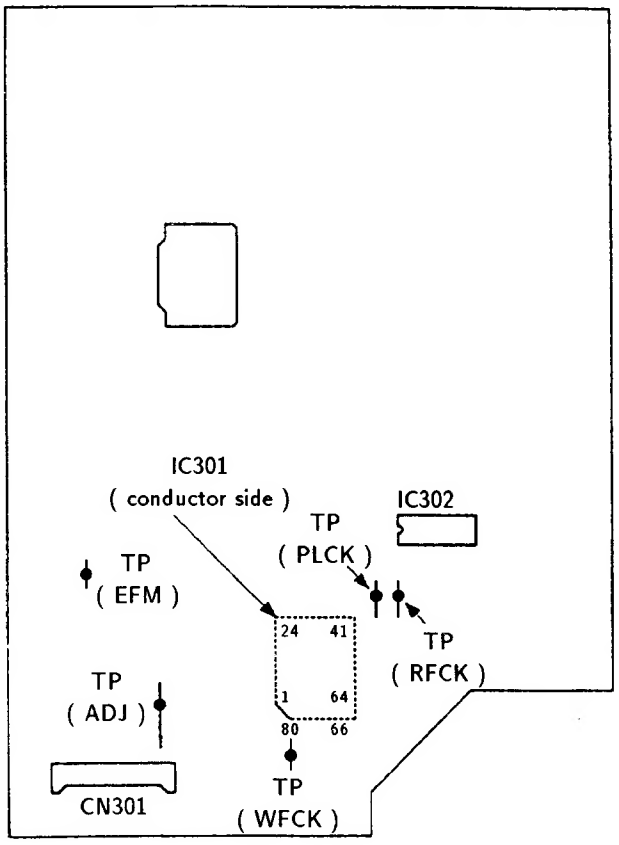

2. Turn Power switch on.
3. Confirm that reading on frequency counter is 4. 3218MHz.

## Focus/Tracking Gain

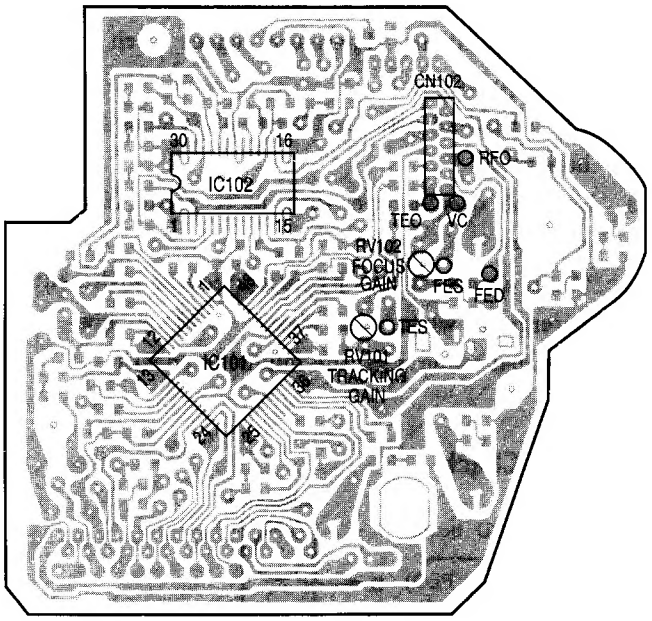
This gain has a margin, so even if it is slightly off. There is no problem.
Therefore, do not perform, this adjustment.
Please note that it should be fixed to mechanical center position when you moved and do not know original position.

## Adjustment Location ;

【MAIN BOARD】 – Component Side –




[ BD BOARD ] – Component Side –

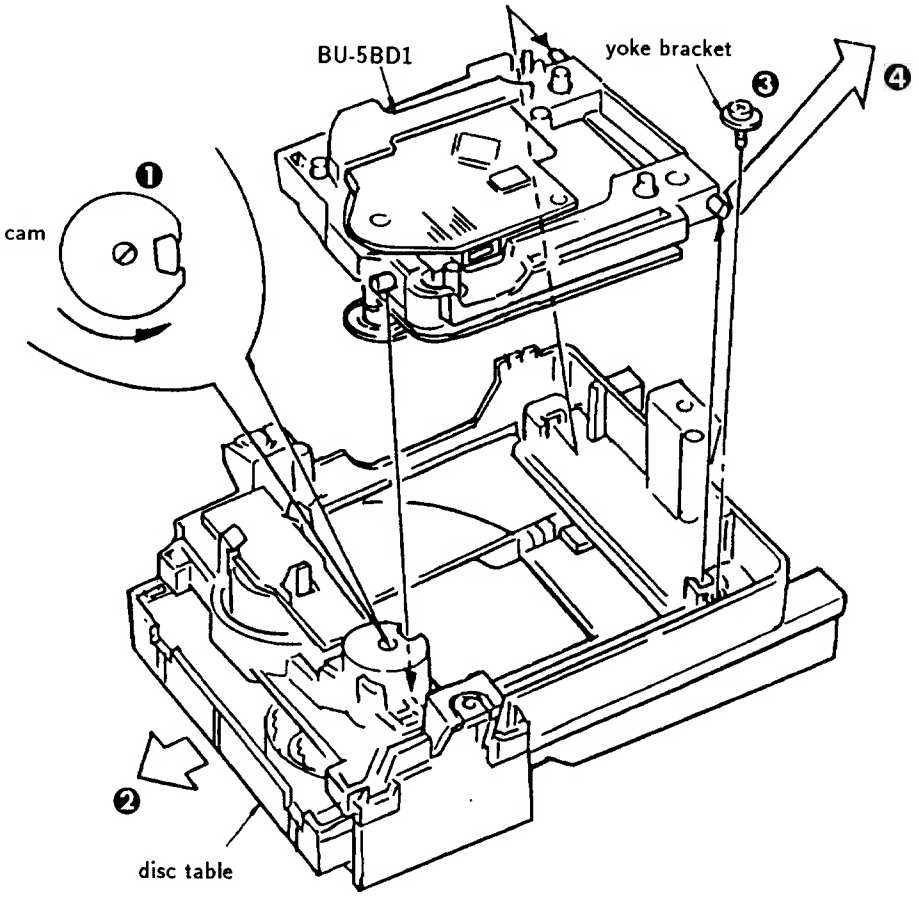


# SECTION 3
# DISASSEMBLY

Note :

Follow the disassembly procedure in the nomerical order given.

❶ Turn the cam to the direction of arrow (Counter clock wise) by minus screw driver.
❷ Take off the disc table.
❸ Remove the yoke bracket.
❹ Remove the MD (BU-5BD1) to the direction of arrow.



# SECTION 4
# DIAGRAMS

## 4-1. PIN FUNCTION OF IC101 AND IC401

### • IC101 (CXA1372Q) PIN FUNCTION

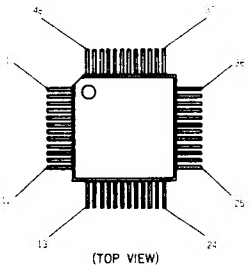
| Pin No. | Pin Name | I/O | Description |
|---|---|---|---|
| 1 | VC | – | GND when two (±) dual power supplies are in use, or the center voltage (2.5V) when a single power supply is in use. |
| 2 | FGD | I | Time constants for gain switching in normal mode/down mode and for focus gain are connected between the FGD and FS3 pins. |
| 3 | FS3 | I | |
| 4 | FLB | I | The capacitor for low frequency boost in the focus servo loop is connected. |
| 5 | FEO | O | Focus drive output. |
| 6 | FE– | I | Inverted input to focus amplifier. |
| 7 | SRCH | I | Time constants to generate the focus search waveform are connected. |
| 8 | TGU | I | Time constants for gain switching in normal mode/up mode and for tracking gain are connected between TGU pin and TG2 pin. |
| 9 | TG2 | I | |
| 10 | AVCC | – | Analog power supply (5V when ± dual power supplies are in use, 5V when a single power supply is in use.) |
| 11 | TAO | O | Tracking drive output. |
| 12 | TA– | I | Inverted input to tracking amplifier. |
| 13 | SL+ | I | Non-inverted input to sled amplifier. |
| 14 | SLO | O | Sled drive output. |
| 15 | SL– | I | Non-inverted input to sled amplifier. |
| 16 | ESET | I | The 610kΩ phase compensator resistor is connected to this pin. |
| 17 | ISET | I | The current setting resistor is connected to this pin. |
| 18 | SSTOP | I | The limit switch is connected to this pin. |
| 19 | AVEE | – | Analog power supply (–5V when ± dual power supplies are in use, or GND when a single power supply is in use.) |
| 20 | DIRC | I | Direct control pin. |
| 21 | LOCK | I | Sled run-away prevention circuit operates when this signal is "L". |
| 22 | CLK | I | Serial data transfer clock input that is supplied from CPU (or DSP). |
| 23 | XLT | I | Latch input from CPU (or DSP). |
| 24 | DATA | I | Serial data input from CPU (or DSP). |
| 25 | XRST | I | System reset. "L" to reset. |
| 26 | C.OUT | O | Output to tracking counter. |
| 27 | SENS | O | SENS output. |
| 28 | DGND | – | Digital ground (GND). (GND when ± dual power supplies are in use. GND when a single power supply is in use.) |
| 29 | MIRR | O | Mirror output. |
| 30 | DFCT | O | Defect output. "H" when defective. |
| 31 | ASY | I | Auto-assymmetry control input. |
| 32 | EFM | O | EFM comparator output. |
| 33 | FOK | O | Focus OK. |
| 34 | CC2 | I | Defect-bottom-hold input (inout by capacitive coupling). |
| 35 | CC1 | O | Defect-bottom-hold output. |
| 36 | DVCC | – | Digital power supply. (+5V when ± dual power supplies in use. +5V when a single power supply is in use.) |
| 37 | CB | I | The defect-bottom-hold capacitor is connrcted to this pin. |
| 38 | CP | I | The mirror hold capacitor is connected to this pin. |
| 39 | RF1 | I | RF signal input (input by capacitive coupling). |
| 40 | RF0 | I | RF signal input (input by DC coupling). |
| 41 | DVEE | – | Digital power supply (–5V when ± dual power supplies are in use. GND when a single power supply is in use.) |
| 42 | TZC | I | Tracking zero-cross comparator input. |
| 43 | TE | I | Tracking error input. |
| 44 | TDFCT | I | The defect prevention hold capacitor is connected to this pin. |
| 45 | ATSC | I | Anti-shock input. |
| 46 | FZC | I | Focus zero-cross comparator input. |
| 47 | FE | I | Focus error input. |
| 48 | FDFCT | I | The defect prevention hold capactior is connected to this pin. |

## • IC401 (CXP50112-097Q) PIN FUNCTION

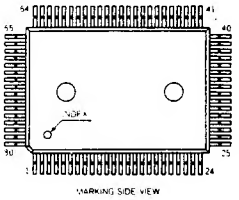
| Pin No. | Pin Name | I/O | Description |
|---|---|---|---|
| 1 - 4 | — | — | Not used (open). |
| 5 - 20 | S1 -S16 | O | Segment output to FL tube. |
| 21 - 28 | 1G - 8G | O | Common output to FL tube. |
| 29 | SCOR | I | Subcode sync signal S0 + S1 detection input from IC301 (CXD2500AQ). |
| 30 | — | — | Not used (open). |
| 31 | +5V | — | +5V |
| 32 | $\overline{\text{RST}}$ | I | Reset input. |
| 33 | +5V | — | +5V |
| 34 | $V_{DD}$ | — | Power voltage terminal (+5V). |
| 35 - 40 | KEY0 - KEY5 | I | Key A/D input. |
| 41 | — | — | Not used (Ground). |
| 42 | TIMER SW | I | Auto play select input (Auto play "L"). |
| 43 | — | — | Not used (Ground). |
| 44 | CLK | O | Serial data transfer clock output to IC301 (CXD2500AQ). |
| 45 | DATA | O | Serial data output to IC301 (CXD2500AQ). |
| 46 | — | — | Not used (Ground). |
| 47 | FOK | I | Focus OK signal input from IC101 (CXA1372Q). |
| 48 | GFS | I | Frame sync signal clock status input from IC301 (CXD2500AQ). |
| 49 | SUBQ | I | Sub code (Q data) serial input from IC301 (CXD2500AQ). |
| 50 | SQCLK | O | Sub code (Q data) readout clock output to IC301 (CXD2500AQ). |
| 51 | XLT | O | Serial data latch output. |
| 52 | PRGL | O | Attenuate data latch clock output to IC302 (CXD2554P). |
| 53 | LDON | O | Laser diode ON/OFF select output of optical pick-up. |
| 54 | AMUT | O | Muting output for IC301 (CXD2500AQ) and Q344 (2SC3399). Muting on by "H", Muting off by "L". |
| 55 - 58 | B0 - B3 | — | Not used (+5V) |
| 59 | DEFECT SW | O | Deffect circuit ON/OFF select output to IC101 (CXA1372Q). |
| 60 | — | — | Not used (open). |
| 61 | SENSE | I | SENS signal input from IC301 (CXD2500AQ). |
| 62 | RMC | I | Remote control signal input. |
| 63 | $\overline{\text{INSW}}$ | I | Input for loading out switch. |
| 64 | $\overline{\text{OUTSW}}$ | I | Output for loading in switch. |
| 65 | ADJ | I | Tset mode input. GFS check will not activate by "L". |
| 66 | AFADJ | I | Test mode input. All test operation will be activate by "L" mode when power on. |
| 67 | LODIN | O | Output for turn the loading motor to loading. |
| 68 | LODOUT | O | Output for turn the loading motor to un loading. |
| 69 | — | — | Not used (open). |
| 70 | — | — | Not used (open). |
| 71 | Vss | — | Ground. |
| 72 | XTAL | O | Clock output. |
| 73 | +5V | — | +5V |
| 74 | EXTAL | I | Clock input. (4MHz) |
| 75 | +5V | — | +5V |
| 76 | −30V | I | Power voltage −30V for built in FL tube controller. |
| 77 | — | — | Not used (open). |
| 78 | — | — | Not used (open). |
| 79 | — | — | Not used (open). |
| 80 | — | — | Not used (open). |

## 4-6. SEMICONDUCTOR LEAD LAYOUTS

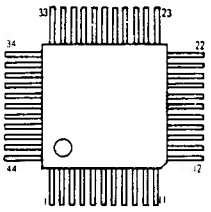
**CXA1372Q**




**CXD2500AQ**
**CXP50112-097Q**



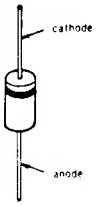

**CXD2552Q**



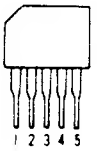
**DTA114ES**
**DTC114ES**
**2SC2458-YGR**
**2SC3623A-LK**

**GP1U52XB**

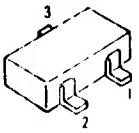
**IN4148M**



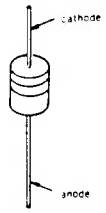

**M5293L**



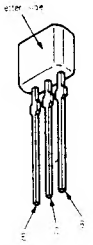

**RD4.7M-B1**



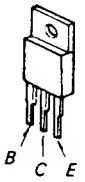

**RD5.6ES-B2**
**RD6.8ES-B1**
**RD7.5JS-B2**
**ISS202-1**
**11ES2**
**11EQS04**



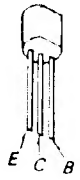

**2SA1175-HFE**



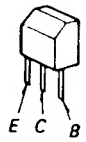
**2SB1094-L**
**2SB1274SA-RS**




**2SC1815-Y**

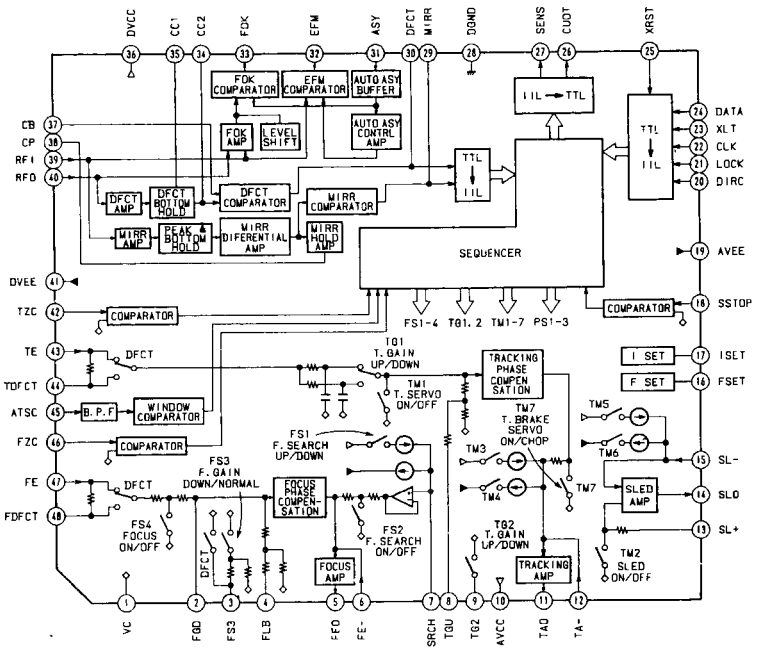



**2SD774-34**

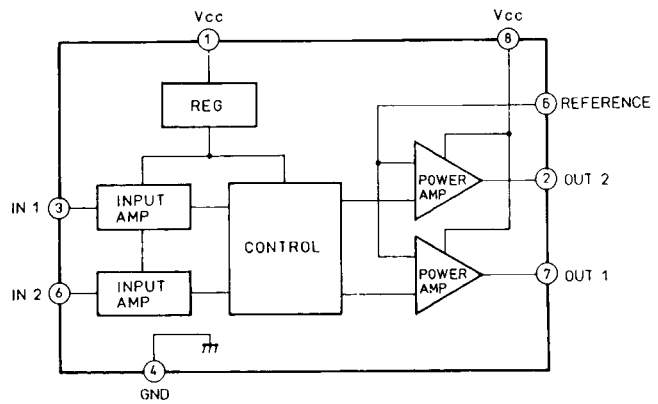


## 4-7. IC BLOCK DIAGRAMS

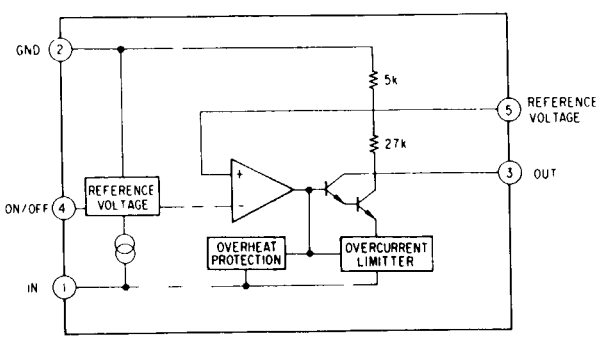
### IC101 CXA1372Q



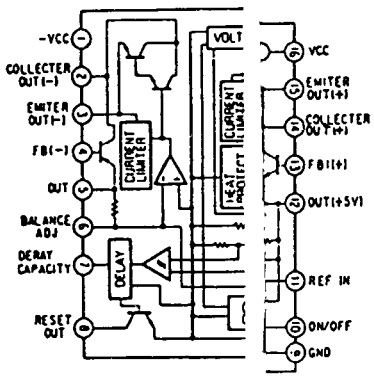

### IC103 M54641L



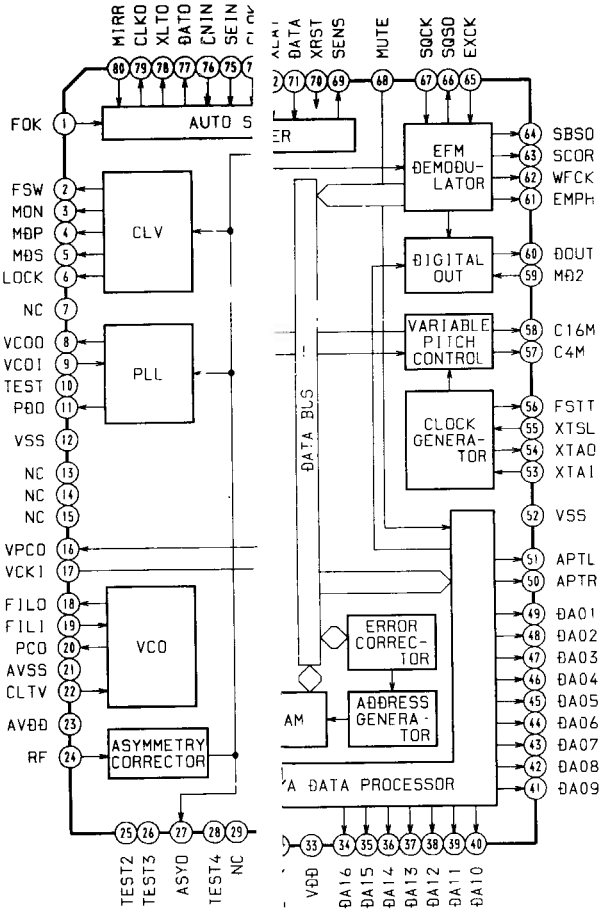

### IC201 M5293L



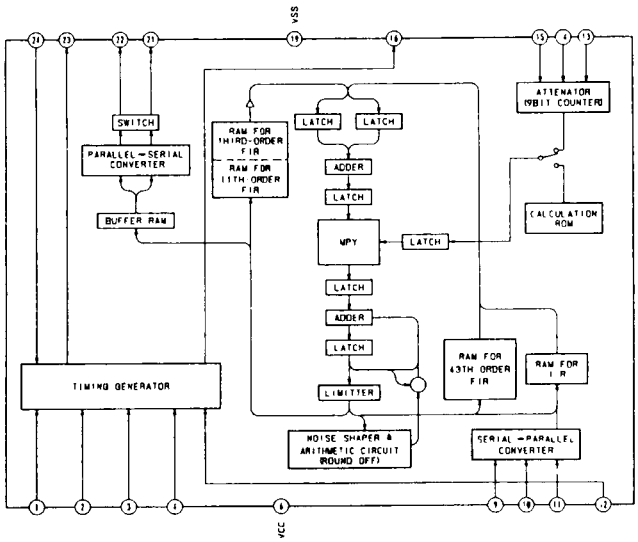
## IC202 M5290P-16



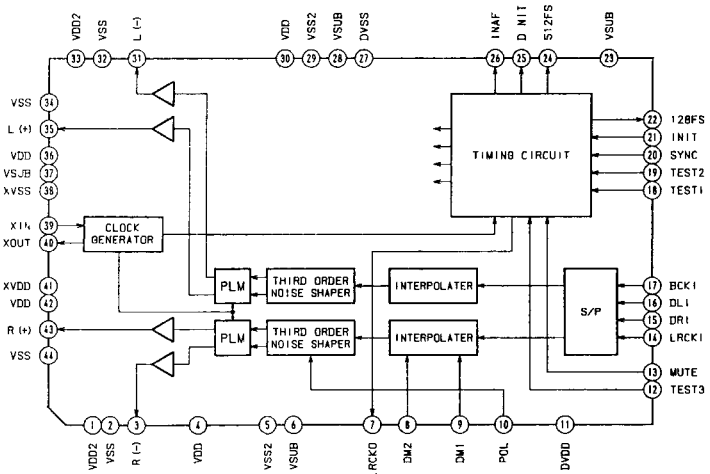

## IC301 CXD2500AQ




## IC302 CXD2554P




## IC305 CXD2552AQ



# SECTION 5
# EXPLODED VIEW

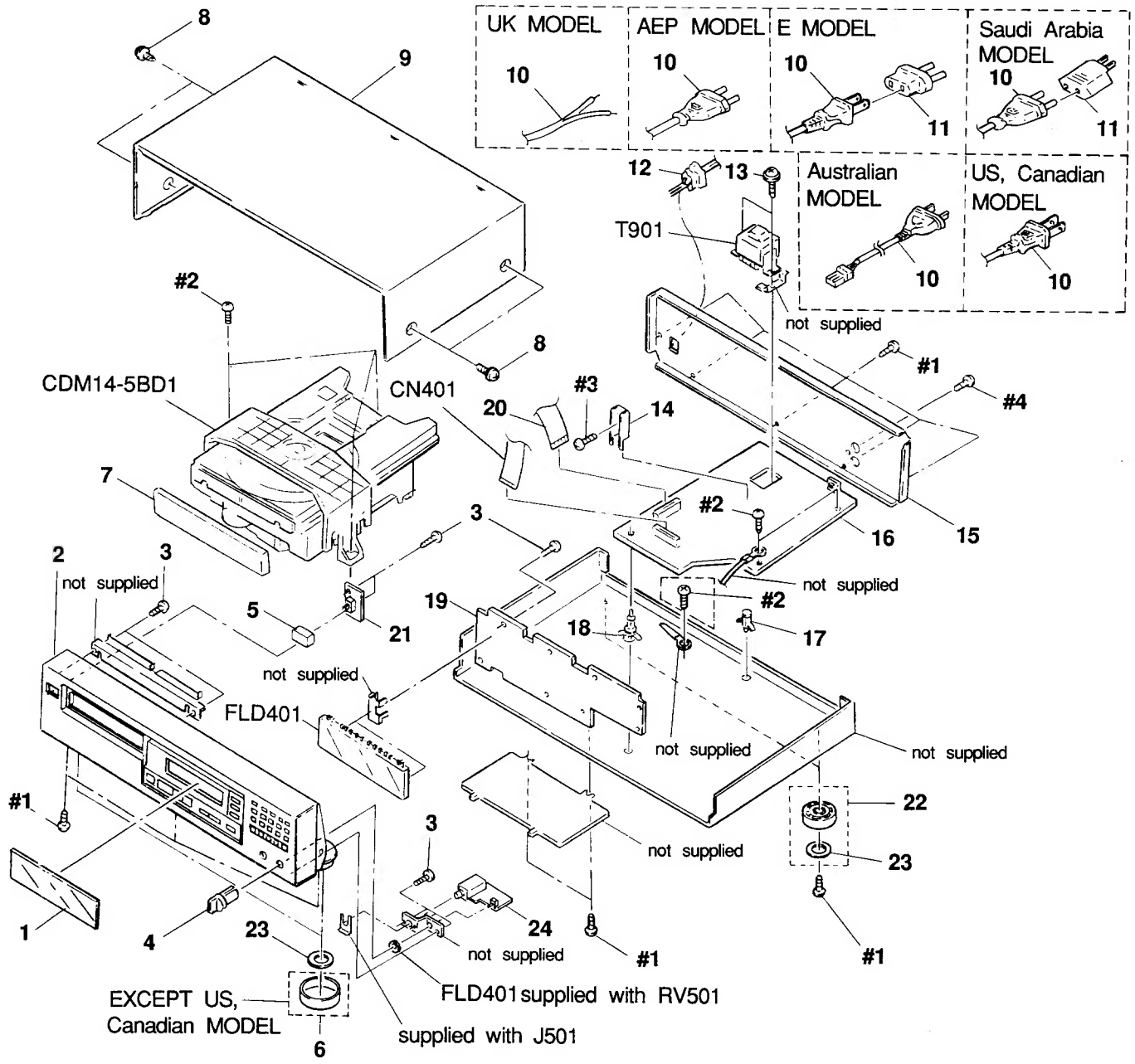
NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Color Indication of Appearance Parts
  Example:
  KNOB,BALANCE(WHITE)...(RED)
  ↑ ↑
  Parts color Cabinet's color
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware(# mark) list is given in the last of this parts list.

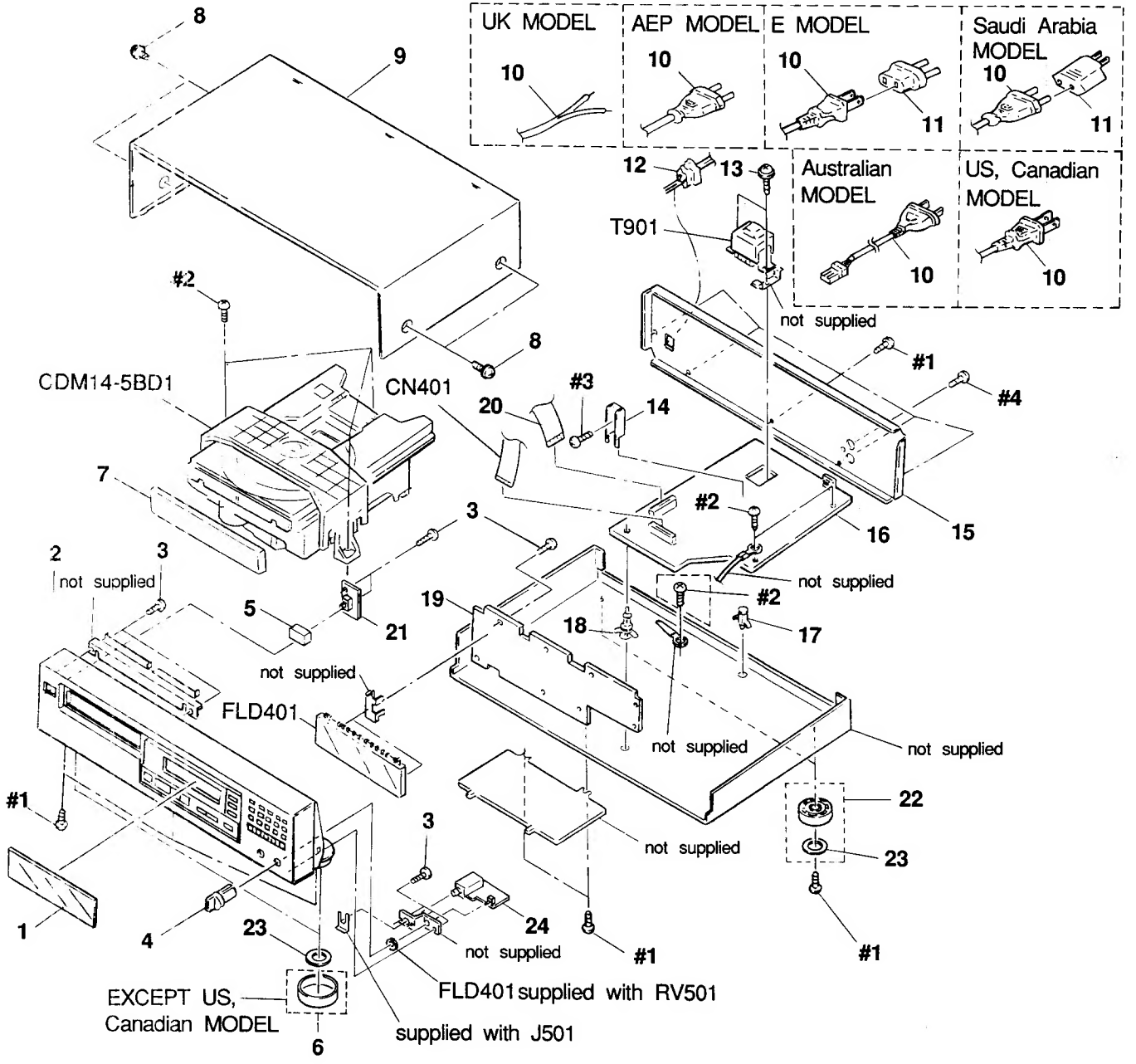
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

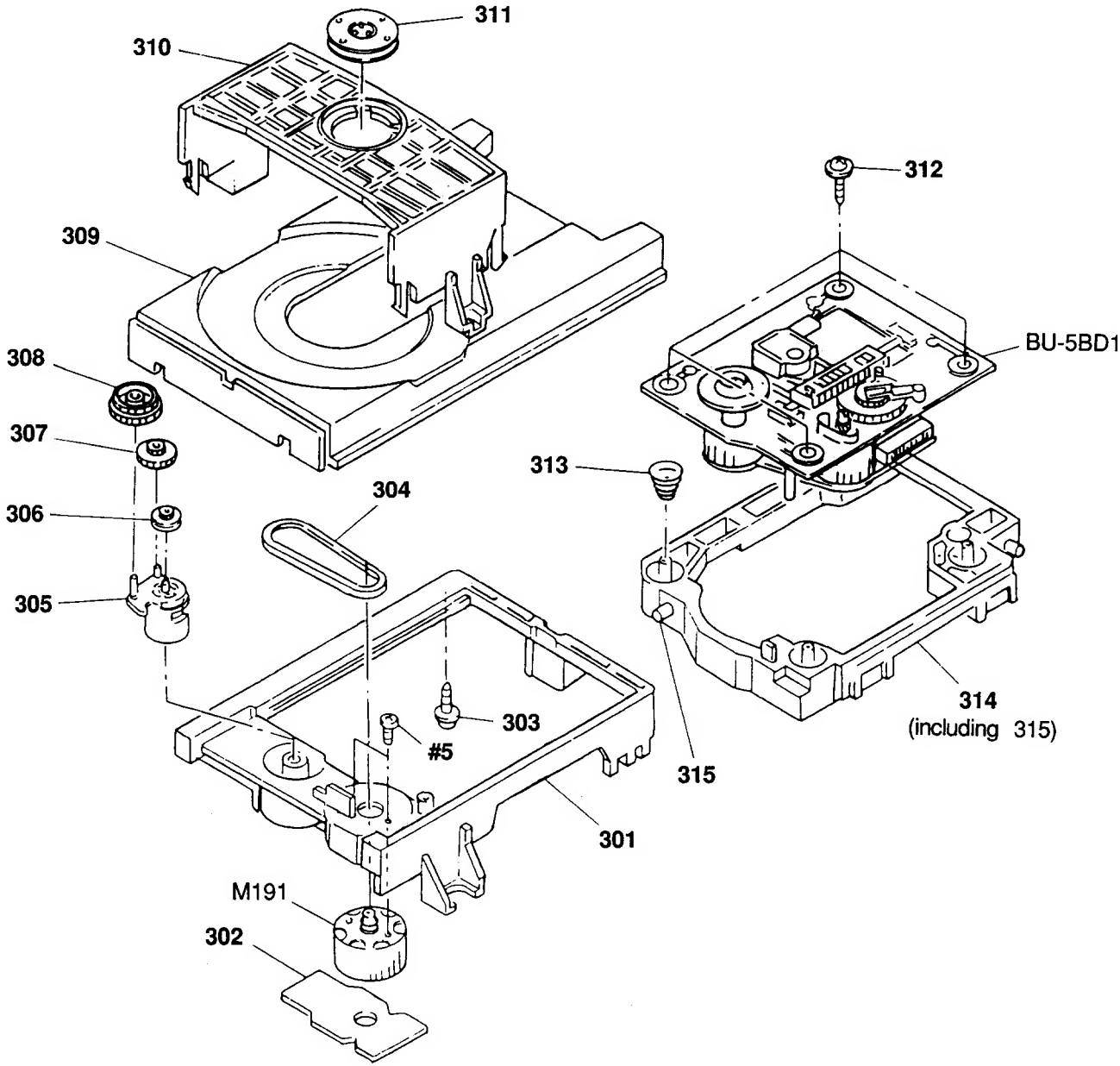
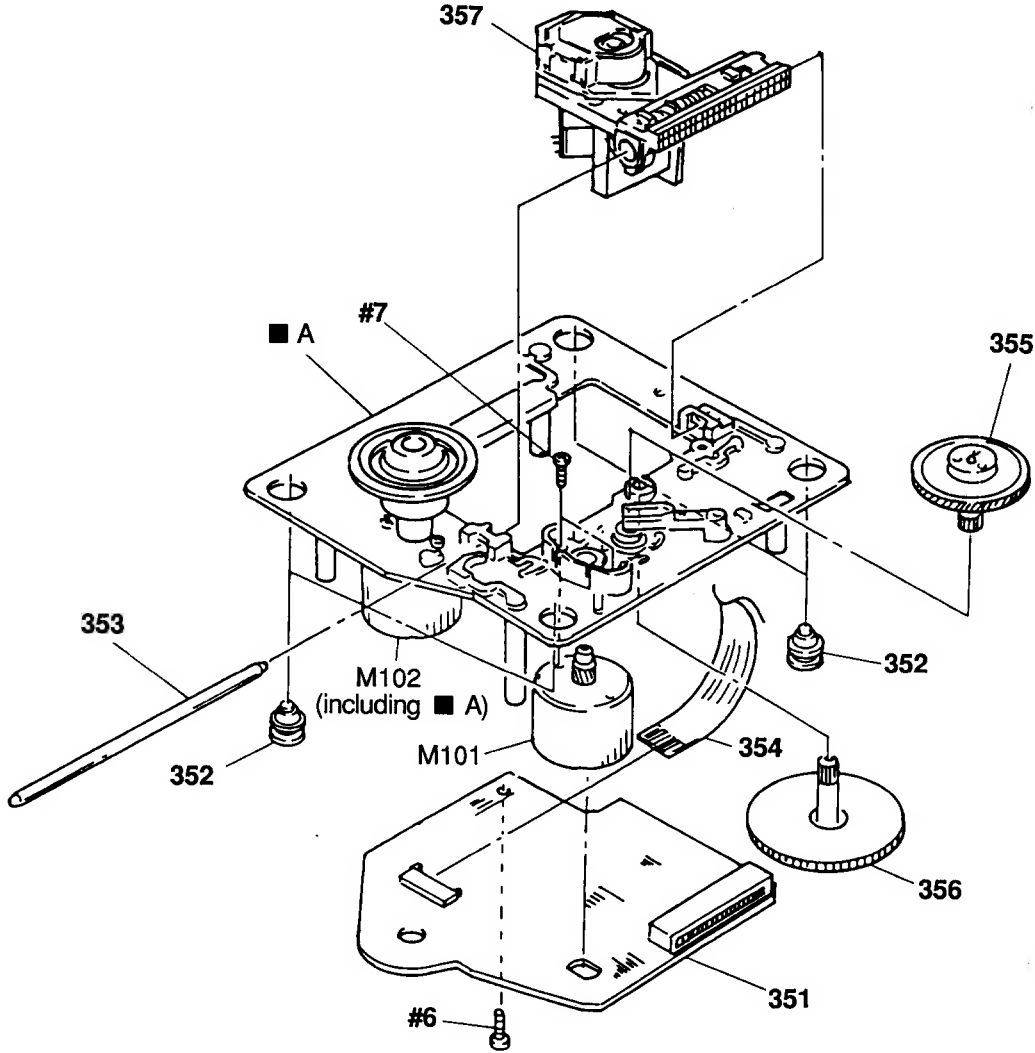
## (1) CABINET SECTION



## (1) CABINET SECTION



## (2) MD SECTION (CDM14-5BD1)



## (3) PICK-UP BLOCK (BU-5BD1)